REMARKS

Claims 1-13 and 15-31 are pending in this application. By this Amendment, claims 18, 21, 27 and 31 are amended. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

A. The Office Action objects to the drawings. Applicants respectfully submit that related art Figure 15 was filed with the application on April 24, 1998. A copy of the postcard stamped to acknowledge receipt by the U.S. Patent and Trademark Office is enclosed. Therefore, Applicants respectfully submit the U.S. Patent and Trademark Office misplaced the Figure. For the convenience of the Examiner, a copy of Figure 15 is enclosed. Withdrawal of the objection to the drawings is respectfully requested.

B. The Office Action rejects claims 1-8, 11-13, 16 and 18-31 under 35 U.S.C. §102(b) over U.S. Patent No. 4,357,497 to Hochmair (hereafter Hochmair). The rejection is respectfully traversed.

With respect to claim 1, Applicants respectfully submit that Hochmair fails to disclose every claimed feature as required under 35 U.S.C. §102. For example, Hochmair fails to disclose a signal generator that generates a second signal capable of causing pseudospontaneous activity in an auditory nerve as recited in claim 1. The Office Action asserts that a carrier signal 75 (e.g., 12 MHz or 31 MHz) in Hochmair discloses a second signal capable of causing pseudospontaneous activity as recited in claim 1. See column 5, lines 38-60 and Figure 2 in Hochmair. Applicants respectfully submit that the Office Action is mischaracterizing Hochmair.

Hochmair discloses that signal 71 is output by monostable multivibrator (MMV) 70 is a modified signal or modified portion of an amplified signal 55 output by a microphone 52 that represents sound. See column 4 lines 57-63 of Hochmair. The signal 71 is used to modulate the carrier signal 75 (e.g., 12 MHz or 31 MHz). See column 5 lines 43-46 of Hochmair. However, carrier signals generally (and in this case the carrier signal 75) are removed by a demodulator such as demodulator 111, and therefore, not applied to the cochlea or the auditory nerve. See column 9, lines 55-61 and Figure 10 of Hochmair. Further, the single signal applied to the cochlea in Hochmair represents audio signals in a band (e.g., 1.0-2.0 KHz) that are transformed to signals having frequencies of 40-400Hz, "as this frequency range is particularly suitable for stimulation the cochlea." See column 5, lines 14-61 including lines 20-23 and 49-53 of Hochmair.

Thus, Applicants respectfully submit that Hochmair discloses a carrier signal similar to previously applied U.S. Patent Number 5,571,148 Loeb. As previously described with respect to Loeb, a multi channel simulator removes the carrier signal prior to determining a signal representing speech for application to an auditory nerve. Loeb discloses the micro-stimulator 20 includes a power supply and demodulator circuit 94 that filters out the carrier frequency signal and produces a data signal DATA and then provides a power signal POWER on electrode(s) 26, 27 using the decoded data signal DATA. See column 15, lines 3-29 and Figures 7A-8 of Loeb. In summary, the information modulated on the carrier frequency (e.g., in Loeb, Hochmair or embodiments of the present invention) can be used stimulate the auditory nerve.

Accordingly, a carrier signal is not capable of causing pseudospontaneous activity in an auditory nerve.

2. Further, Applicants respectfully submit Hochmair discloses electrical signals representative of speech but does not teach or suggest a problem caused by the lack of random activity of a plurality of nerve fibers in an auditory nerve, let alone a particular signal or type of signals that are capable for causing "pseudospontaneous" activity or statistically independent activity in an auditory nerve.

Thus, Applicants respectfully submit that the data signal 71 corresponding to sound in Hochmair will not be in a frequency range or an inter pulse period that would result in pseudospontaneous activity in the auditory nerve nor would the carrier signal 75, which is removed, result in pseudospontaneous activity in the auditory nerve. Finally, Hochmair does not teach or suggest any modification to its disclosure that would result in at least a feature of a cochlear implant system including a signal generator that generates a second signal capable of causing pseudospontaneous activity in an auditory nerve and combinations thereof as recited in claim 1.

With respect to claims 3, 18, 21, 23 and 31, the Office Action asserts Hochmair teaches the variously recited features and combinations thereof. In contrast, Hochmair merely discloses a carrier signal (e.g., at 12 or 31 MHz). As described above, the carrier signal 75 is filtered out by, for example, the demodulator 111 and is not applied to the auditory nerve in Hochmair.

With respect to claims 4-5 and 24-25 the Office Action asserts Hochmair teaches the variously recited features. In contrast, Applicants respectfully submit Hochmair discloses electrical signals representative of speech but does not teach or suggest a problem caused by the lack of random activity of a plurality of nerve fibers in an auditory nerve, let alone a particular signal or type of signals that are capable for causing "pseudospontaneous" activity or statistically independent activity in an auditory nerve.

3. For at least the reasons set forth above, Applicants respectfully submit claim 1 defines patentable subject matter. Claims 11, 16, 22 and 29 define patentable subject matter for at least reasons similar to claim 1. Claims 2-8, 12-13, 18-21, 23-28 and 30-31 depend from claims 1, 11, 16, 22 and 29, respectively, and therefore also define patentable subject matter for at least that reason as well as their additionally recited features. Withdrawal of the rejection of claims 1-8, 11-13, 16 and 18-31 under 35 U.S.C. §102 is respectfully requested.

C. The Office Action rejects claims 22 and 24-28 under 35 U.S.C. §102(b) over U.S. Reissue Patent No. 32,947 to Dormer (hereafter Dormer). The rejection is respectfully traversed.

With respect to claim 22, Applicants respectfully submit that Dormer fails to disclose every claimed feature as required under 35 U.S.C. §102. For example, Dormer fails to disclose a signal generator that generates a second signal, wherein the second signal includes at least fluctuations in amplitude greater than a prescribed amount at a frequency above approximately

2 kHz, wherein the combined signal is for application to the auditory nerve and combinations thereof as recited in claim 22.

The Office Action asserts that a 16kHz carrier signal provided by carrier frequency generator means 36 in Dormer discloses a second signal and an electrical signal from amplifier means 32 are combined to output a combined signal and combinations thereof as recited in claim 22. Dormer discloses a microphone 30 detecting sound and an amplified proportional electrical signal resulting therefrom (the output of amplifier means 32) is used to modulate the 16kHz carrier signal. See column 4 lines 51-61 of Dormer. However, as described above with respect to Hochmair (and earlier Loeb), the carrier signal is removed in Dormer by an internal coil assembly 6, and therefore, is not applied and is not for application to the cochlea or the auditory nerve. See column 3, lines 63-65 and Figure 1 of Dormer. The single signal applied to the cochlea in Dormer represents the information modulated (e.g., sound/speech) on the carrier frequency that was later (e.g., internal coil assembly) removed and used stimulate the auditory nerve.

Further, Applicants respectfully submit Dormer discloses electrical signals representative of speech but does not teach or suggest a problem caused by the lack of random activity of a plurality of nerve fibers in an auditory nerve, let alone a particular signal or type of signals such as recited in claim 22 that are capable for causing "pseudospontaneous" activity or statistically independent activity in an auditory nerve.

Thus, Applicants respectfully submit that a signal output by the amplifier means 32 corresponding to sound in Dormer will not be in a frequency range or an inter pulse period that would result in pseudospontaneous activity in the auditory nerve nor would the 16 kHz carrier signal, which is removed, be for application to the auditory nerve. Finally, Dormer does not teach or suggest any modification to its disclosure that would result in at least a feature of an apparatus including a signal generator that generates a second signal capable of inducing a random pattern of activation in an auditory nerve or a combined signal for application to the auditory nerve and combinations thereof as recited in claim 22.

With respect to claim 27, Applicants respectfully submit that Dormer discloses a carrier signal at 16 kHz output by the carrier frequency generator means 36 that is removed. Thus, Dormer does not teach or suggest at least a feature of a combined signal for modulation of a carrier signal.

For at least the reasons set forth above, Applicants respectfully submit claim 22 defines patentable subject matter. Claims 24-28 depend from claim 22, and therefore also define patentable subject matter for at least that reason as well as their additionally recited features. Withdrawal of the rejection of claims 22 and 24-28 under 35 U.S.C. §102 is respectfully requested.

D. The Office Action rejects claims 9-10, 15 and 17 under 35 U.S.C. §103(a) over Hochmair. The rejection is respectfully traversed.

As described above, claim 1 defines patentable subject matter. Applicants respectfully submit that claims 11 and 16 define patentable subject matter for at least reasons similar to claim 1. Claims 9-10, 15 and 17 depend from claims 1, 11 and 16 respectively, and therefore also define patentable subject matter for at least that reason as well as their additionally recited features. Withdrawal of the rejection of claims 9-10, 15 and 17 under 35 U.S.C. §103 is respectfully requested.

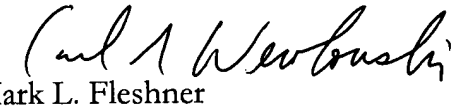
CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that this application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney, **Carl R. Wesolowski**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
FLESHNER & KIM, LLP



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Amended Claims With Mark-ups to Show Changes Made

18. (Twice Amended) The auditory prosthesis of claim 16, wherein the pseudospontaneous driving signal includes one of (i) a pulse train generating substantially continuous activation, (ii) a broad band noise, or (iii) at least fluctuations in amplitude greater than prescribed amount at a frequency above approximately 2k Hz, wherein the electrical signals stimulate the auditory nerve.

21. (Amended) The method of claim 11, wherein the second signal includes one of (i) a pulse train generating substantially continuous pseudospontaneous activity, (ii) a broad band noise, and (iii) at least fluctuations in amplitude greater than prescribed amount at a frequency above approximately 2k Hz that causes statistically independent activity in a plurality of nerve fibers of the nerve, wherein the driving signal is used to modulate a carrier signal.

27. (Amended) The apparatus according to claim 22, wherein the prosthesis is a cochlear implant applying current to the auditory nerve, wherein the combined signal is for modulation of a carrier signal.

31. (Amended) The method of claim 29, wherein the neural prosthetic apparatus is a cochlear implant, wherein the second signal and the electrical signal are used to modulate a carrier signal.